

CLEAN SET OF AMENDED CLAIMS PENDING ENTRY OF
PRELIMINARY AMENDMENT

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1. A luminescent micro- or nanoparticle,
characterized in that
it contains luminescent substances having long
luminescence decay times and said luminescent
10 substances are essentially shielded from ambient
chemical, biochemical and gaseous parameters
2. The particle as claimed in claim 1,
characterized in that
15 one or more luminescence properties of said
luminescent substances, which are in particular
selected from the group consisting of quantum
yield, spectral characteristics, luminescence
decay time and anisotropy, are essentially
20 independent of the particular environment.
3. The particle as claimed in claim 1, characterized
in that
the luminescent substances are metal/ligand
25 complexes of ruthenium(II), osmium(II) rhenium(I),
iridium(III) platinum(II) and palladium(II) as
central atom.
4. The particle as claimed in claim 3,
30 characterized in that
the luminescent substances are complexes with 2-
or 3-dentate polypyridyl ligands such as 2,2'-
bipyridine, bipyrazine, phenanthroline, terpyridyl
or derivatives thereof as ligands.
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5. The particle as claimed in claim 3,
characterized in that
the luminescent compounds are the tris complexes
of ruthenium(II) with 2,2'-bipyridyl, 1,10-

phenanthroline, 4,4-diphenyl-2,2'-bipyridyl and 4,7-diphenyl-1,10-phenanthroline as ligands.

- 5 6. The particle as claimed in claim 1,
characterized in that
the luminescent substances are carbonyl complexes
of Re(I) with additional diimine ligands such as
derivatives of 2,2'-bipyridyl and 1,10-
phenanthroline.
- 10 7. The particle as claimed in claim 1,
characterized in that
the luminescent compounds are porphyrin complexes
of Pt(II) and Pd(II) as central atoms.
- 15 8. The particle as claimed in claim 1,
characterized in that
it contains an organic polymer which distinguishes
itself by low absorption of water or/and minimum
gas permeability.
- 20 9. The particle as claimed in claim 8,
characterized in that
it contains an organic polymer from the group
consisting of polyacrylonitrile, poly(meth)acrylic
copolymers, polyvinyl chlorides or polyvinylidene
chlorides and copolymers thereof.
- 25 10. The particle as claimed in claim 9,
characterized in that
it contains polyacrylonitrile or polyacrylonitrile
copolymers, in particular copolymers with acrylic
acid, acrylic amines or/and acrylic esters.
- 30 11. The particle as claimed in claim 1,
characterized in that
it contains a glass which is essentially free of
micropores.
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12. The particle as claimed in claim 11,
characterized in that
it contains a glass which has been produced
according to a sol/gel process.
13. The particle as claimed in claim 11,
characterized in that
it contains a sol/gel glass which has been
prepared from silicon, titanium, zirconium or/and
tin tetraalcoholates.
14. The particle as claimed in claim 1,
characterized in that
its surface has been modified by reactive groups
such as amino, epoxy, hydroxyl, thiol or/and
carboxyl groups which make possible the covalent
coupling of luminescent indicators or/and
biomolecules.
15. The particle as claimed in claim 14,
characterized in that
it contains luminescent indicators or/and
biomolecules covalently coupled to its surface.
16. A method for preparing luminescent micro- and
nanoparticles as claimed in claim 8, wherein the
particles are precipitated from a polymer solution
in which the luminescent compound is present in
soluble form by adding a liquid dropwise, with the
liquid being miscible with the polymer solvent but
causing a reduction in the solubility of the
polymer.
17. The method as claimed in claim 15, wherein the
particles are precipitated from a solution
comprising dimethylformamide and polyacrylonitrile
or polyacrylonitrile copolymer, in which the

luminescent compound is present in soluble form,
by adding water or an aqueous solution dropwise.

- 5 18. The method as claimed in claim 16, wherein the
particle diameter is adjusted by varying the
polymer content of the solution.
- 10 19. A method for preparing luminescent micro- and
nanoparticles as claimed in claim 8, wherein the
luminescent compound is incorporated by diffusion
from a solvent (mixture) into already
prefabricated particles.
- 15 20. A method for preparing luminescent micro- and
nanoparticles as claimed in claim 8, wherein the
particles are formed by spraying a polymer
solution in which the luminescent compound is
present in soluble form and evaporation of the
solvent.
- 20 21. The method as claimed in claim 20, wherein the
particle diameter is adjusted by varying the
polymer content of the spray solution.
- 25 22. A method for preparing luminescent microparticles
as claimed in claim 11, wherein the luminescent
compound is incorporated into compressed
monolithic sol/gel glasses which are subsequently
ground and fractionated according to size.
- 30 23. The use of the luminescent micro- and
nanoparticles as claimed in claim 1 for labeling
and luminometric detection of biomolecules from
the group consisting of toxins, hormones, hormone
35 receptors, peptides, proteins, lectins,
oligonucleotides, nucleic acids, antibodies,
antigens, viruses and bacteria.

24. The use of the luminescent micro- and nanoparticles as claimed in claim 1 as reference standards of fluorescence intensity signals in fluorimetric assays.

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25. The use as claimed in claim 23, wherein addition of the standard to the sample converts the intensity information into a phase signal or/and a time-dependent parameter.

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26. The use of the luminescent micro- and nanoparticles as claimed in claim 1 for referencing the luminescence intensity signal of optical luminescence sensors, wherein the particles are immobilized to a solid phase together with a luminescent indicator.

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27. A method for luminometric determination of a biochemical or chemical parameter using two different luminescent dyes which have different decay times and the time or phase characteristics of the resulting luminescent response are used for generating a reference parameter for determination of said parameter, with the first luminescent dye corresponding to said parameter at least with respect to luminescence intensity and the second one not corresponding to said parameter at least with respect to luminescence intensity and luminescence decay time, characterized in that the second luminescent dye is used in the form of particles as claimed in claim 1.

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